matrix solid that traverses the surface of the insulator and connects at least two electrode locations on the module. In FIG. 5B the electrokinetic conductor 47 is electrically connected to metal conductor elements 43A and 43B through holes 46A and 46B. The electrokinetic conductor intersects a fluidic conduit 50 of housing 41 at a location along its length between electrode openings 46A, 46B.

This invention contemplates the use of an electrokinetic conductor 47 formed from a hydrophilic matrix layer by microfabrication as described later and in detail in applicant's co-pending patent application SN. 09/871,823. However, it will be appreciated that the electrode module of this invention could also be adapted for use with electrokinetic conductors of prior art devices. Thus, prior art gel-slab devices as well as prior art micro-channel electrokinetic devices can be adapted for use with the modules of the current invention to convert those prior devices into ones with low-cost integral electrodes. In the case of the gel-slab device, the electrokinetic conductor is a gel lane, or an array of gel lanes, cast between two planar surfaces, as described in U.S. Pat. No. 5,192,412. For example, one surface is a corrugated surface with a set of parallel grooves each of which constitutes a mold-form for the gel that defines the shape of the lanes. The other surface, typically a flat insulating plate in the prior art devices, could be adapted to incorporate the electrode module of the current invention. In the case of the prior art micro-channel device, an electrokinetic conductor element is formed by microfabricating a capillary channel, or array of such channels, into a planar insulating substrate. A flat plate placed over the substrate covers the open channels to complete the device. The electrokinetic conductor is an electrolyte fluid that is pumped into the empty channel at or before use of the device. In a modification to this device, the planar cover plate could be adapted to incorporate an electrode module of the current invention.

from the matrix during the forming process. By way of example, a hydrophilic matrix material containing electrolyte salts and buffers is deposited on the planar substrate from an aqueous solution by spinning, spraying, printing or dipping. Spinning is preferred. A photoresist layer is coated thereon from a non-aqueous solvent. It is exposed and developed. The photoresist pattern is then transferred by etching into the underlying hydrophilic matrix material using a plasma process that leaves no ash in the etched areas. The plasma etch step concurrently removes the photoresist layer. For example, when the hydrophilic matrix contains only carbon, hydrogen, oxygen and nitrogen, an oxygen plasma will etch the material forming only volatile etch products and no ash. In this example the hydrophilic matrix should be formulated with non-metallic salts and buffers to be ash-free during oxygen plasma etching. Thus the compositions of the hydrophilic matrix and its electrolytes, buffers and reagents are preferably chosen to be suitable for ash-free plasma etch processing. Using the above described ash-free dry processing techniques one or more hydrophilic layers may be sequentially processed into formed structures without exposure to wet developers.

In a preferred microfabricated electrokinetic device the hydrophilic matrix electrokinetic conductor layer can be further overcoated by a microfabricated insulator (not shown in FIG. 5). The overcoating insulator would have an opening to enable contact with sample fluid in the conduit 50. Also preferred is that the insulator be permeable to water vapor so that the hydrophilic matrix of the electrokinetic conductor can be fabricated dry and wetted-up for use by incorporation of water through the insulator layer, as described in detail in applicant's co-pending application SN 09/871,823

The use of the preferred embodiment of the invention as shown in FIGs. 5A and 5B is discussed in the following. In use, a sample of fluid is collected and inserted into the housing of